

# PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

REC'D 14 SEP 2005

WIPO

PCT

Applicant's or agent's file reference 60937-0203WO	<b>FOR FURTHER ACTION</b> <div style="text-align: right;">See Form PCT/PEA/416</div>	
International application No. PCT/US2004/025913	International filing date (day/month/year) 12.08.2004	Priority date (day/month/year) 14.08.2003
International Patent Classification (IPC) or national classification and IPC C09G1/02		
Applicant EKC TECHNOLOGY, INC. et al.		
1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36. 2. This REPORT consists of a total of 6 sheets, including this cover sheet. 3. This report is also accompanied by ANNEXES, comprising: a. <input type="checkbox"/> sent to the applicant and to the International Bureau a total of     sheets, as follows: <input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions). <input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box. b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s))     , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).		
4. This report contains indications relating to the following items: <div style="margin-left: 20px;"> <input checked="" type="checkbox"/> Box No. I     Basis of the opinion  <input type="checkbox"/> Box No. II    Priority  <input type="checkbox"/> Box No. III   Non-establishment of opinion with regard to novelty, inventive step and industrial applicability  <input type="checkbox"/> Box No. IV    Lack of unity of invention  <input checked="" type="checkbox"/> Box No. V     Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement  <input type="checkbox"/> Box No. VI    Certain documents cited  <input checked="" type="checkbox"/> Box No. VII    Certain defects in the international application  <input checked="" type="checkbox"/> Box No. VIII   Certain observations on the international application         </div>		
Date of submission of the demand  10.03.2005	Date of completion of this report  13.09.2005	
Name and mailing address of the international preliminary examining authority:  <div style="display: flex; align-items: center;"> <div>             European Patent Office              D-80298 Munich              Tel. +49 89 2399 - 0 Tx: 523656 epmu d              Fax: +49 89 2399 - 4465           </div> </div>	Authorized Officer  olde Scheper, B  Telephone No. +49 89 2399-	



**INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY**

International application No.  
PCT/US2004/025913

---

**Box No. I Basis of the report**

---

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
  - ☐ publication of the international application (under Rule 12.4)
  - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements\*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

**Description, Pages**

1-45 as originally filed

**Claims, Numbers**

1-20 as originally filed

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
  - ☐ the claims, Nos.
  - ☐ the drawings, sheets/figs
  - ☐ the sequence listing (*specify*):
  - ☐ any table(s) related to sequence listing (*specify*):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
  - ☐ the claims, Nos.
  - ☐ the drawings, sheets/figs
  - ☐ the sequence listing (*specify*):
  - ☐ any table(s) related to sequence listing (*specify*):

\* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY**

International application No.  
PCT/US2004/025913

---

**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

---

**1. Statement**

Novelty (N)	Yes: Claims	1-3,5,8,11-18,20
	No: Claims	4,6,7,9,10,19
Inventive step (IS)	Yes: Claims	
	No: Claims	1-20
Industrial applicability (IA)	Yes: Claims	1-20
	No: Claims	

**2. Citations and explanations (Rule 70.7):**

**see separate sheet**

---

**Box No. VII Certain defects in the international application**

---

The following defects in the form or contents of the international application have been noted:

**see separate sheet**

---

**Box No. VIII Certain observations on the international application**

---

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

**see separate sheet**

**INTERNATIONAL PRELIMINARY  
REPORT ON PATENTABILITY  
(SEPARATE SHEET)**

International application No.

PCT/US2004/025913

**Re Item IV.**

1. See Item V, paragraphs 4 and 6.

**Re Item V.**

- 1 The following documents are referred to in this communication:

D1: WO-A-03 064551

D2: US-A-6 527 622

D3: EP-A-1 283 250

D4: EP-A-1 405 886

- 2 The present application encompasses 4 independent process claims, i.e. claims 1, 2, 3 and 4, as well as 16 dependent claims, i.e. claims 5-20.
- 3 It should be noted that the claims on file are by no means restricted to the mandatory features expressed in said claims. Due to the feature "comprising" there is no restriction regarding the presence of any additional component and/or process step.
- 4 Document D1 discloses the same method as the present application (see claims 36-75; paragraphs [0005] to [0014]) but fails to identify ruthenium as a noble metal. Table VIII discloses a composition H which comprises 0.1 mol/kg periodic acid, water, quaternary amine, 0.5 wt-% Ludox TM-50 (silica having an average particle size of about 30 nm) and exhibits a pH of 7. Said composition is used to polish a substrate (Table 2).

Thus, the subject matter of claim 4 lacks novelty (Art. 33(2) PCT). The subject matter of dependent claims 6, 7, 9, 10 and 19 is anticipated as well (Art. 33(2) PCT).

- 5 Ruthenium is known as a metal which is found in platinum ores and is also used to harden platinum. This could mean that skilled person could find (traces of) ruthenium in any commonly used platinum. If this is true, present claim 1 would lack novelty.

- 6 The technical relationship between independent claims 1, 2, 3 and 4 are the special technical features (i) "method of polishing a substrate", (ii) noble metal", (iii) "aqueous composition", (iv) "periodic acid" and (v) "silica abrasive". Prior art document D1 discloses said special technical features (see paragraph 4 above).  
The concept linking said independent claims 1, 2, 3 and 4 is therefore known and as a consequence there is no single inventive concept and the application lacks unity (Rule 13 PCT).
- 7 Document D2 discloses CMP methods in which ruthenium is identified as a noble metal and is compared to platinum. D2 also discloses the beneficial use of periodic acid and salts (see column 6, lines 11-17; claims 5 and 31).
- 8 Document D3 discloses a CMP process and the compositions used in said process which are comparable to those used in the present application but fails to mention either noble metals or ruthenium.
- 9 Even though the subject matter of present claims 1-3, 5, 8, 11-18 and 20 may meet the requirements of Art. 33(2) PCT for formal reasons (see nevertheless paragraph 5 above), the question of inventive step (Art. 33(3) PCT must be answered.

In view of the objection under Rule 13 PCT it may be noted that it is unclear what features are to be regarded as the distinguishing features over the available prior art and which distinguishing feature leads to what effect, if any.

The PCT International Search and Examination Guidelines (PCT/GL/ISPE/1.) indicate a specific method of assessing inventive step, which might be to apply the so called "problem-solution approach". The approach consists of the following stages (see PCT/GL/ISPE.1, A13.08.1):

1. determining the closest prior art (see also paragraph 13.08);
2. establishing the objective technical problem to be solved; and
3. considering whether or not the claimed invention, starting from the closest prior art and the objective technical problem would have been obvious to the skilled person.

**INTERNATIONAL PRELIMINARY  
REPORT ON PATENTABILITY  
(SEPARATE SHEET)**

International application No.

PCT/US2004/025913

Since no inventive step can be assessed, the objectives regarding inventive step as set out in the Guidelines PCT/GL/ISPE/1, 2.02 and 2.03 cannot be met.

**Re Item VI.**

Document EP-A-1 405 886, published on 07 April 2004, claims the priority of 01 October 2002 (JP 2002289202). This document discloses CMP polishing of ruthenium using a composition comprising silica, periodic acid compound and an ammonia compound (see [0010] and claims 1-10).

**Re Item VII.**

- 1 The application as filed does not contain any clear reference to existing prior art. According to the requirements of Rule 5.1(a)(ii) PCT the applicant is obliged to furnish, according to the best of his knowledge, a true presentation of existing prior art.

**Re Item VIII.**

- 1 It may be noted that present claims 1-3 define the mere presence of ruthenium only (i.e. traceable amounts due to the feature "comprising"). This implies that the features "...removal rate of the ruthenium..." (see claim 1), "...removal selectivity of the ruthenium to the low-K dielectric..." (see claim 2) and "...the polishing rate of tantalum oxide....the polishing rate of ruthenium" (see claim 3) may not be related to ruthenium at all, but relate to the (undefined) composition which only comprises ruthenium. The same problems arise in dependent claims 5, 14 and 18.

The same applies also to the feature tantalum oxide used in claim 3.

It appears therefore that the subject matter of claims 1-3, 5, 14 and 18 lacks clarity (Art. 6 PCT).